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REMARKS

1. New claims 24-25 have been added to provide adequate coverage for applicant's contribution to the art. New claim 24 is based on the description on P. 7, lines 5-23, P.9, lines 8-10, P.11, lines 9-18 and Figures 4-6. New claim 25 includes the language on P. 22, lines 24-25. Since no new matter has been entered by the amendments, it is respectfully submitted that they should be entered.
2. Claims 1-17, 19-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Schirtzinger, U.S.P. 3,686,048 in view of WO 91/08895 to Li et al.

Applicants respectfully request the withdrawal of this rejection for the reasons that follow. Claim 1 as previously amended includes the limitation that "...the final volume ratio of matrix islands to the plurality of filaments in the composite is approximately 0.5 or less". This limitation has no counterpart in either Schirtzinger or Li.

Examiner has noted (Para. 4) that Schirtzinger does not specify the amount of matrix but suggests that it would be obvious through routine experimentation to find the optimum amount of resin which allowed for both the formation of a "strong" array and the subsequent full impregnation of the fiber array. A "strong" array in the context of the Schirtzinger disclosure is one that holds together during subsequent processing and full impregnation. In contrast, the objectives of the present invention are the preparation of composites "...useful in high-impact resistant, flexible articles" (P.1, line 9), especially ballistically resistant composites. It is respectfully submitted that in view of these different objectives between Schirtzinger and the present invention, it is improper to assume that the "optimum" amount of resin for the purposes of Schirtzinger would be the same as in the present invention.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of the claim against the prior art" *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic" *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed.Cir. 1993)

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"To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed.Cir. 1999) (citations omitted)

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Applicants respectfully submit, therefore, that a *prima facie* case of obviousness has not been established for amended claim 1 and claims 2-17 and 19-23 that depend directly or indirectly therefrom.

3. Claims 7-8 stand rejected under 35 U.S.C. 112 second paragraph as being indefinite because it is not stated whether the molecular weight greater than 500,000 recited for polyethylene is a weight average or a number average molecular weight. Examiner is unpersuaded by the expert Declaration filed 5/23/02 since U.S. Patents 5,558,448 and 6,202,726 recite number average molecular weights for ultra high molecular weight polyethylene.

At issue is how one of ordinary skill in the art would understand term "molecular weight" as it may be applied to ultra-high molecular weight polyethylene (UHMW-PE).

The Declaration by Dr. M. E. McDonnell, filed 5/23/02, cited two criteria; First, what is standard terminology in the area and second, what can be measured?

With respect to the first question, Dr. McDonnell referred to ASTM Standard D4020-92 "Standard Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials" (attached). At paragraph 3.2.1.1, *Discussion* we read:

"It has been common practice to refer to the "molecular weight" of UHMW-PE resins. The following calculations can be used to approximate the specific viscosity (η_{sp}), reduced viscosity (η_{red} or RSV), intrinsic viscosity (η or I.V.), and the approximate weight average molecular weight of virgin resin."

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The ASTM standard thus indicates that it is commonly understood that the term "molecular weight" refers to "approximate weight average molecular weight".

Examiner has cited U.S. Patents 5,558,448 (the '448 patent) and 6,202,726 (the '726 patent) as counter examples since they refer to number average molecular weights of UHMW-PE. The examples in the patents are MIPELON® XM220 produced by Mitsui Petrochemical Industries Ltd. (U.S.P. 5,558,448, Col.5, lines 66-67), and GUR® 4120 produced by Hoechst GmbH (U.S.P. 6,202,726, Col 6, lines 57-60, Col. 8, lines 59-62).

Attached is a product brochure for MIPELON® polyethylene from Mitsui Chemicals America. The brochure shows the "molecular weight" of MIPELON XM-220 to be 2,000,000.

Attached also is a product data sheet for GUR® polyethylene from Ticona Inc., a corporate descendent of Hoechst GmbH. The data sheet shows the "average molecular weight" of GUR 4120 to be 5,000,000 g/mol.

It is seen that each of the manufacturers of the UHMW-PE materials in the '448 and '726 patents use the term "molecular weight" or "average molecular weight" without specifying the type of average. Moreover, the ASTM standard indicates that this is the "common practice".

The second criterion suggested in Dr. McDonnell's Declaration is what can be measured. ASTM Standard D4020 specifies measurements of dilute solution viscosity which lead to "approximate weight average molecular weight". The MIPELON brochure also specifies "molecular weight" through a relationship to intrinsic viscosity. Once again, the GUR data sheet calculates "average molecular weight" from intrinsic viscosity. It is clear that "approximate weight average molecular weight" is measurable and that each of these sources conduct such measurements. Moreover, the results are simply termed "molecular weight" or "average molecular weight".

With respect to the references in the '448 and '726 patents to number average molecular weights, on close examination of the patents, one finds no evidence that number average molecular weights were actually determined.

In view of these facts, it is submitted that following statement in the Declaration by Dr. M. E. McDonnell, an expert in the field of determination of the molecular weight of polymers is unrefuted.

"Classical, absolute molecular weight determination methods do not have the sensitivity to measure number-average molecular weights

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for typical, unfractionated polyethylene samples greater than or equal to 500,000."

It is submitted that the above documentation shows that claims 7-8 point out and distinctly claim the subject matter of the invention with more than a reasonable degree of clarity and particularity and therefore satisfy the requirements of 35 U.S.C. 112.

4. In light of the foregoing amendment and remarks, it is submitted that the claims now of record, i.e. claims 1-17 and 19-23, and new claims 24-25 are allowable and should be passed to issue. Applicants respectfully request the same. The Examiner is invited to call the undersigned attorney if there are any unresolved issues to discuss same.

Respectfully submitted,
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I hereby certify that this correspondence is being deposited with the United States Patent & Trademark Office via facsimile to Examiner E. Cole, Group Art Unit 1771, at 703-872-9310 on November 20, 2002.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE**IN THE CLAIMS**

- Rule 128 27
24. A composite comprising multiple layers of fibrous webs; wherein each fibrous web is comprised of a plurality of filaments; and a plurality of matrix islands, each of said matrix islands having an average size of less than 5 mm in a planar dimension and connecting at least two filaments so as to hold the plurality of filaments in a unitary structure; and wherein the final volume ratio of matrix islands to the plurality of filaments in the composite is approximately 0.5 or less.
- 25
25. The composite of claim 24 having improved ballistic effectiveness compared to a composite having a continuous polymeric matrix.